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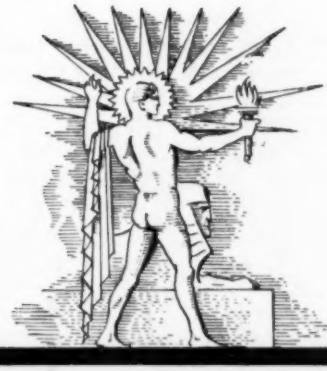
# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



June 22, 1940

## Taking Off

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A SCIENCE SERVICE PUBLICATION

# Do You Know?

Some fire trucks are built to carry *carbon dioxide* as the main extinguishing agent, instead of water pumps and chemicals.

Courses in *aviation* mechanics have enabled 85 CCC boys in California to obtain work in west coast aircraft manufacturing plants.

Chemists say that the only truly *synthetic* fabrics being made are nylon, glass, and Vinyon—rayon being technically a "modified fiber."

First country to use *railways* in military operations was Canada—troops were transported by rail in the Papineau rebellion of 1837-8.

California's record-breaking 15,000-foot *oil well* was drilled so precisely that the bottom of the hole was only two and one-half degrees off vertical.

Scientists in Peru have shown that *pyrethrum* flowers, used in commercial insecticides, can be grown in that country, but farmers are slow to undertake the crop.

A printing ink company says that the average person can think of only about 35 *color names* in five minutes, and only 18 will be clearly understood by other people.

It is estimated that Americans contributed $9,800,000 to *relief* in Europe and Asia in the first six months after Europe's war began—a per capita donation of about eight cents.

## QUESTIONS DISCUSSED IN THIS ISSUE

*Most articles which appear in* SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

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**MEDICINE**

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**NUTRITION**

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**RADIO**

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Why are radio studios built skew? p. 393.

**RESOURCES**

What strategic material was bought by the United States from Italy? p. 392.

Canned *tomatoes* can be greatly improved in firmness by adding a tiny amount of calcium chloride, chemists report.

A new outlet for *surplus American cotton* is insulating material which can be made from cotton, linters, and spinnable waste.

One feature of its 200th discovery anniversary in 1943, South Dakota hopes, will be a *monument* in honor of the Verendrye discovery expedition.

America has ample facilities for making *plastics* for use in mass production of airplanes, declares one plastics company.

The identification tag worn by each German soldier also shows to what *blood group* he belongs, in event of surgical emergency.

Conscious of India's economic backwardness, the Indian National Congress has formed a *National Planning Committee*, with 29 expert subcommittees.

**SCIENCE NEWS LETTER**

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PHYSICS

# Superheavy Element 94 Discovered in New Research

## Confirmation of Fermi's Nobel Prize Research Begins Discovery of Whole New Group Heavier Than Uranium

DISCOVERY of a whole new group of chemical elements heavier than number 92, uranium, which the textbooks now list as the universe's heaviest, has begun through the positive identification of element 93 and the probable discovery of element 94 at Berkeley, Calif.

The element-adding research, done by Dr. Edwin M. McMillan of the University of California and Dr. Philip Hauge Abelson of the Carnegie Institution of Washington, confirms the discovery made several years ago by Prof. Enrico Fermi, Italian Nobelist now working at Columbia University, of element 93.

When in January, 1939, the sensational splitting of uranium atoms with release of power was discovered, the existence of element 93 was called into question. Dramatically this happened at about the time that Prof. Fermi received the Nobel prize for his researches. Now Prof. Fermi's discovery is vindicated and the discovery at Berkeley of still another superheavy element is indicated.

It is expected that the discovery of element 94 of atomic weight 239 will be reported in an early issue of the *Physical Review*.

Theoretically this new element 94 might be converted by self-destruction or radioactive emission of a helium nucleus into the uranium of atomic weight 235 which is sought as source of atomic power, but, surprisingly, this new element 93 is very stable. There is no likelihood that it can be used in the manufacture of the power-producing uranium.

Here is the train of events in the submicroscopic world of the atom that gives rise to the new heavy-weight elements:

Starting with the common sort of uranium 92 of 238 atomic weight, this element is bombarded with relatively feeble neutrons of 25-volt energy. One of these is captured by resonance and the ordinary uranium becomes radioactive, with a half-life of 23 minutes. This produces element 93 of atomic weight 239. This is the element discovered by Prof. Fermi.

The new element 93 is itself unstable and is radioactive, half of it disintegrating every 2.3 days. The existence of this reaction was first noted but not identified last year by Dr. E. Segre, a former colleague of Prof. Fermi's at Rome, working at the University of California.

Now the McMillan-Abelson research indicates that with emission of electrons the element 93 changes to element 94 of atomic weight 239.

Thus two elements heavier than uranium are added to the periodic table of the fundamental building blocks of the matter of the universe.

The discovery of other heavier elements may be expected as research progresses. For example, element 95 is being sought. The relative stability of element 94 among elements that are all radioactive brings hope that the others will be identified.

If the element 94 of 239 atomic weight gave off an alpha particle or helium atomic nucleus of weight 4, it would be converted into the power-emitting uranium 235. But preliminary explorations are understood to have indicated a very long lifetime for element 94, perhaps many thousands of years, making highly improbable any possible production of uranium 235 by this means.

*Science News Letter, June 22, 1940*

ENGINEERING

## Dancing Light Beam Gives More Faithful Sound

SNATCHING from the laboratory a dancing mirror to render more faithful reproductions of phonographically recorded sound, a new sound system for home and commercial phonographs was introduced by David Grimes, chief engineer of the Philco Corporation.

Instead of the conventional needle of the ordinary phonograph, a featherweight sapphire floats along the groove of the record. The recorded sound is

*BIGGEST DINOSAUR FOOTPRINT*

***That is the claim made for this 54-inch depression in a rock stratum near Glen Rose, Texas, uncovered by a University of Texas paleontological survey, aided by the WPA, Dr. E. H. Sellards directing. When the 50-ton, 80-foot-long Brachiosaurus set his yard-and-a-half foot down here in Cretaceous times, about 130,000,000 years ago, what is now rock was soft seashore mud. Now, three-year-old Tommy Pendley from a nearby farm finds the footprint a nice wading pool.***

translated into minute bobbings of a paper-thin aluminized mirror, such as heretofore has been used only in galvanometers and oscillographs of research laboratories.

A tiny beam of light from a specially made lamp plays on the mirror, which reflects it to a small photoelectric cell, creating in the cell an electric current that corresponds to the sound variations on the record. Amplified and reproduced in a loud speaker, this current gives a high degree of faithfulness with a minimum of scratch.

Since the motion of a needle in the record's groove does not need to bear down heavily to set up mechanical or crystal vibrations, it is claimed that the life of the record is increased at least ten times. Needle changing is eliminated.

*Science News Letter, June 22, 1940*

NUTRITION

# Europe Eats Meat Today Unable to Save for Tomorrow

## Large-Scale Slaughter of Food Animals, Including Dairy Cows, Provides Plenty Now But Scarcity Ahead

THE FAMOUS killing of the goose that laid the golden eggs is matched unwillingly in Europe today by large-scale slaughter of food animals—including dairy cows that provide milk, butter and cheese.

Result: Meat on dinner tables in embattled countries today, but perhaps less by the end of 1940. It takes about three years to breed and bring beef cattle to market stage; six months for hogs.

A dairy cow starts giving milk at about two years.

Whether this will actually lead the world into a meat shortage, food economists hesitate to predict. It depends, they say, on the length and course of the war, and how well countries involved can keep the livestock replacements up.

Encouragingly, the world's meat cupboard is far from bare. On the contrary, outbreak of war found world cattle, hogs, and sheep at fairly high level. By latest estimates, the world's dairy and meat cattle totaled about 697,000,000; hogs, 294,000,000; sheep, 634,000,000, all larger totals than averages a few years back.

The champion beef exporter of the world, Argentina, for example, had a 6% larger supply of beef in 1939 than in 1938. England's cattle and sheep were near record high, Germany had 2,000,000 more hogs than in 1938. Small Denmark when invaded by Germany had in the fields the largest number of cattle in her history — 3,258,000. Danish pigs, however, were fewer than in some recent years.

The United States, recovering from bad drought years of 1934 and 1936, has been increasing its livestock, though there is little likelihood of a tremendous all-time high such as our cattle production reached in 1918. In this war, Europe prefers to buy guns and airplanes from the United States rather than meat and bread.

Killing of meat and dairy animals in countries hard-pressed by war needs is attributed to varied causes: There is shortage of feed for animals. Grazing land provides more food if it can be sowed to grain. Devastation has swept large farming areas.

In Finland, thousands of cattle were slaughtered when Finns evacuated the area given up to Russia. Agriculturists commented tersely: It solved the meat problem, at expense of the future.

Great Britain, warned by her advisers to plan for long war, has actually increased her cattle, in spite of heavy slaughter, according to a sample census taken this spring. Britain's sheep have not yet decreased, and hogs not much.

But the picture of British livestock supplies is regarded as less satisfactory than this summary would indicate, since the reports show that even dairy cattle, which got priority of feed, have often been on short rations and have given less milk.

It is forecast that by next year, England's meat animals will diminish in number, and the United Kingdom will be anxiously purchasing more heavily abroad than now—or eating less meat. Even this year, Britain is buying more beef from South America, more lamb from New Zealand than last year. Canada is supplying large quantities of pork.

Just now it is patriotic to eat pork in England, to consume quantities of this meat on hand. British refrigeration facilities do not permit storing pork on any such scale as America takes for granted.

Fate of Denmark's fine herds is being watched, by statisticians who follow the "food war." How long Germany expects to fight may be indicated by the recklessness or caution shown toward Danish farm animals. Already, large numbers of Denmark's young pigs and hogs not up to market weight are reported slaughtered.

What has happened to the meat and dairy supplies in Poland, Netherlands, Belgium and north of France cannot yet be summarized.

Admitting that the "fat gap" is the weakest point in her nutrition, Germany has tried determinedly to keep up milk production in the Reich, and to avoid such wholesale killing of stock as she came to in the World War. "Swine murder" some German critics called it, in World War days, when 8,000,000 hogs were killed in a year and when cattle were reduced in 1918 from nearly 22,000,000 to less than 18,000,000.

The food war has caused most misery to unfortunate countries that sought to be neutral and found themselves overrun by invaders. Their lands wrecked by armies, their people driven about as refugees, they are first to face famine danger.

The expanded Reich has apparently loosed the force of the Allied food blockade, by gaining power over supplies in invaded countries, and by gaining laborers, however inexperienced, who can be drafted to work German farms.

England, on the other side, has not found her food shipments from overseas seriously menaced by German submarines and mines. In the main, Allied losses have been more than made up by German cargoes the Allies have seized.

Entrance of Italy into war on the side of Germany struck another blow to the French food supply. For cargoes of food for France had been moving steadily across the Mediterranean from African colonies, not heretofore interfered with by Italy.

*Science News Letter, June 22, 1940*

## ● RADIO

**Dr. Waldo G. Leland, director of the American Council of Learned Societies will talk on "International Obligations of American Scholarship" as guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Thursday, June 27, 4:00 p.m., EDST, 3:00 EST, 2:00 CST, 1:00 MST, 12:00 PST.**

**Listen in on your local station. Listen in each Thursday.**

***MERRY-GO-ROUND FOR HEALING***

***Dr. S. J. Hawley, of Geisinger Memorial Hospital, Danville, Pa., is demonstrating for physicians at the American Medical Association meeting his new turntable for preventing X-ray burns during cancer treatment.***

MEDICINE

# Gunshot Wounds Mortality Remains at World War Level

## Increase of a Fifth in Velocity of Bullet Recently Makes It Cause Much More Damage to Abdominal Organs

MEN SHOT in the abdomen have no better chance of surviving today than they had during the first World War, despite improvements in the surgeon's technic.

Higher powered ammunition in use today is the reason, Dr. Elkin L. Rippy, Nashville, Tenn., surgeon, declared at the meeting of the American Medical Asociation in New York City.

Army surgeons will find blood banks more valuable than X-ray machines for handling such wounds, he suggested. Taking time for X-rays to locate the bullet probably does more harm than good because of the delay involved. Blood transfusions are especially valuable because the greatest single factor in death from gunshot wounds is the amount of blood lost. Of 112 injured who had severe hemorrhages, 83% died.

Gunshot wounds of the abdomen remain the most effective method of killing, he has found. Although his studies were made in peace, he reminded fellow surgeons they may soon be faced with the job of caring for gunshot wounds of war "since at the present time over half the world is engaged in war and the peace of the rest of the world hangs by a thread."

An increase of 20% in the velocity of the bullet in the past 25 years makes it cause more damage to abdominal organs, he said. The smaller the caliber of the rifle or pistol, the lower the mortality, Dr. Rippy found from investigating 292 cases of gunshot wounds of the abdomen occurring in Nashville between 1923 and 1939. Most of the shotgun cases were attempted murder, with guns shot at close range and tearing holes so large it was almost impossible to repair the damage.

The increased velocity of modern bullets which causes so much damage is beyond the control of the surgeon, but Dr. Rippy pointed out five factors making for the recovery of the wounded which the surgeon can control. These are: Prompt operation—the earlier the victim is operated on the greater his chance for recovery; choice of anesthetic; operative technic; length of time taken for the operation; and care before and after operation.

*Science News Letter, June 22, 1940*

## Turntable for Cancer

PATIENTS suffering from cancers deep within their bodies are expected to be helped by a turntable apparatus devised by Dr. S. J. Hawley, of the Geisinger Memorial Hospital, Danville, Pa.

While X-rays are being used to destroy the cancer, the patient lies on a turntable which rotates him during the treatment. The X-ray beam is aimed directly at the cancer, but the rotation of the patient causes the beam to spread over the large skin area which continually moves in the beam. This avoids damage to the skin without sacrificing cancer-destroying dosage of the X-rays. Before invention of the turntable device, physicians tried to avoid skin damage by aiming two, three, four or more X-ray beams at the cancer through separate areas of the skin.

*Science News Letter, June 22, 1940*

## Human Teeth Can Kill

HUMAN teeth may not rate with bombs and guns as lethal weapons, but they can be used to kill a man or woman. Serious injuries and one death in 56 cases of bites inflicted by human teeth were reported by Dr. Frank F. Boland, Emory University School of Medicine, Atlanta.

The danger of death from the human bite is especially great if the fingers and hands are attacked. Reasons for this are: First, virulent germs found in the mouth infect the apparently trivial wound. Once the skin is broken, the infection is rapidly conveyed along the muscles and tendons. This is worse if the hand has been clenched; when the muscles relax they carry the germs deep into the tissues. Third, the joints and tissues are so complicated that it is difficult to free them from the infection once it has entered.

"The fellow who carried brass knuckles was wiser than he knew," Dr. Boland commented, since one way to get a fatal

bite is to push one's clenched fist into the mouth of another in a fight.

*Science News Letter, June 22, 1940*

## Eye Used by Four

AN EYE that has been transplanted three times, serving as a seeing organ in four separate individuals, was on display at the meeting of the American Medical Association. The eye belonged originally to a salamander. It is part of an investigation on causes of blindness being carried on by Dr. L. S. Stone and Dr. Frederick A. Wies, of Yale University School of Medicine. When the eye is transplanted, the seeing part, which is the retina, at first degenerates almost completely.

Between two and three months later, however, a new retina has formed and grown nerve connections to the brain. Not only can one eye be transplanted completely from one salamander to another, but eyes can be exchanged between animals of different species, without loss of eyesight.

Chances of transplanting an entire eye in man are remote because, for one thing, no one would want to sacrifice a good eye for the sake of the experiment. In rats, which are much closer to man than salamanders are, complete transplantation of eyes has not succeeded. The eye has healed and developed a blood supply following the transplantation, but vision has not returned.

The pin-point eye of a half-inch-long, pearly pink baby opossum may give doctors knowledge of the cause, and then, possibly, of how to prevent, cataracts in children. Dr. Stone had just started this part of the study. The baby 'possum was chosen because at birth it has an eye in the same stage of development as the human eye five weeks after the human baby starts to form in its mother's body. It is at this stage, doctors believe, that the damage which results in cataract occurs to the eye lens. Dr. Stone is trying now to find what conditions cause such damage.

*Science News Letter, June 22, 1940*

*Coins* less than a fifth of an inch in diameter were among those used in India more than 2,200 years ago.

The Pacific entrance to the *Panama Canal* is 27 miles farther east than the Atlantic entrance.

One person in ten in this country has some *speech defect* or voice abnormality, says a physician.

AERONAUTICS

# What Army and Navy Planes Are Being Furnished Allies

### Although Navy Was First To Release Planes, Army Is Likely To Trade in the Largest Number

A WIDE variety of Army and Navy warbirds is now available to the Allies under the administration's new trade-policy, it was agreed in aviation circles, though opinions differed on how far Allied needs would be allowed to go in stripping the American air services.

Here are thumbnails of Army and Navy favorites which no one dreamed a year ago would ever engage in anything more deadly than mock combat with cameras for guns:

Curtiss SBC-4, the famous Navy "helldiver" of which 50 have been ordered back to the manufacturer in Buffalo. It is a scout bomber, top speed about 270 miles an hour, dive-bombing specialist and therefore useful for ground attack. Full data have not been released by the Navy. The 50 already released were land-based for the use of reserve pilots. Scores more are on duty aboard the Navy's carriers.

Vought SB2U-1, a monoplane Navy scout bomber. Forty of an almost exactly similar model, the V-156, were delivered to France last winter. The Navy has dozens of these aboard carriers: two squadrons of 18 each on each carrier. France has a new carrier which has not yet been equipped with planes. Unlike the helldiver, however, few Voughts, if any, are on reserve duty. Top speed of the V-156, 259 m.p.h.

Curtiss P-36, the Army's standard pursuit plane. Hundreds have been in action in France since the start of the war and have proved extremely successful against the famed Messerschmitt 109, despite the fact they are not quite as fast. The French P-36 has been altered by mounting six instead of two machine guns and the installation of armor. Top speed of the Army's Cyclone-powered machine, just over 300 miles an hour; top speed of the twin-wasp-engined French plane 315—but the French systematically overrun the motor. Engine failure is not most important risk that a pilot at war takes.

Douglas B-18 bombers: military versions of the ubiquitous DC-3, 21-passenger airliner. The Army has more than 200. They are slow, 225 miles an hour, partly because speed was sacrificed to range. The Army has already begun replacing them with 290-mile-an-hour Douglas B-26 and Martin B-23 heavy twin-engined bombers. Canada already has about twenty B-18s for coastal patrol work. If the Allies want B-18s it is a good bet they will be released.

Douglas Northrop A-17 attack planes: 250-mile-an-hour hedgehoppers built for attacking troops. They are obsolete and are to be replaced by North American and Douglas attack bombers, which have two engines and are bigger and much faster. The Army has a couple of hundred A-17s.

Grumman biplane fighters, of several different types: these are the deep-bellied squat planes you think of nine times out of ten when you think of Navy fighters. Top speeds, around 250 miles an hour; among the most maneuverable craft in the world. They are being replaced by Grumman and Brewster monoplanes which are much faster, but of which the Navy has few on hand.

Other models will probably be released but these are the most important.

Though the Navy was the first to actually release any planes, as was the case during the Russo-Finnish war, when 42 Brewster F2A-1 monoplane fighters on order were turned over to Finland, there is a likelihood that more Army planes than Navy will be traded in. The fleet's ship-borne aircraft and the patrol bombers of the scouting force are an important Naval element, and the fleet is still the first line of defense. If any American armed service ever sees action, a possibility which strategists cannot exclude even in days of calmest peace, it will be the Navy. Similar reasoning will probably also decide that among the Army squadrons the first to be stripped will be National Guard and reserve units and the last the powerful wings which guard the Canal Zone and Hawaii.

Many of the planes to be released to the Allies are obsolete or obsolescent. But they are at least as good as many actually in service on both sides of war zone. And one of the lessons of the war is that quantity is far more important than quality.

*Science News Letter, June 22, 1940*

*LATEST IN "HAM" GEAR*

***A television transmitting and receiving system built around a new iconoscope camera tube developed by RCA is here being adjusted by an amateur. On the table to the left is receiver. Transmitter is in background.***

RADIO

# Cheap Television Camera Permits Amateur Television

## Complete Transmitting System Can Be Built for $300 Or Less With New Seven-Inch Cheap Iconoscope Tube

TO THE conversations by voice and by dot-dash, now sent out by amateur radio stations, may soon be added the squeals of sight transmission. Electronic television, using basically the same method as that employed by professional stations, is now made possible with the production of a simplified and relatively inexpensive iconoscope tube, the "eye" of television cameras.

The new tube, developed in the Harrison laboratories of the Radio Corporation of America, is about seven inches long, compared with 20 inches for the professional iconoscope. They are quite different in appearance, the amateur tube resembling a tapering drinking glass, with the top sealed.

In use, the face of the tube takes the place of the film in a camera, a small lens focussing the image upon the sensitive surface. This is transparent, and the light passes through to the back, where it is sprayed by a stream of electrons, moving across the picture in 120 horizontal lines, at a speed of 300 miles an hour. Electrical impulses are generated, corresponding to the lights and shadows. Thirty times each second the picture is completely covered, so that many pictures are sent in a second.

In the professional systems, each picture is divided into 440 or more lines. Thus, the amateur system does not give the detail of the more elaborate apparatus, but the view is about as clear as a newspaper halftone.

A cathode ray tube, for viewing the picture, has also been developed with similar characteristics to the transmitter. In demonstration equipment built by RCA engineers, this tube is placed immediately behind the iconoscope where it immediately reproduces the picture being sent, and therefore serves as the finder on a camera. This cathode ray tube can also be used in the receiving equipment, where it gives a picture about two inches in diameter. However, a larger receiving tube may also be used, giving a correspondingly bigger picture, though with no more detail. Technical details of the apparatus used both for transmitting and receiving are included in a series of articles now appearing in *QST*, official publication of the American Radio Relay League, national organization of amateurs.

The amateur iconoscope tube will retail for slightly under $25, and a complete transmitting station can be built for $300 or less, depending upon the equipment the amateur already has available. Those who now have transmitters using the 2½ meter wavelength, can easily adapt them to send television alternately with sound. Existing amateur licenses permit television transmission on the 2½ meter band, and shorter waves.

*Radio amateurs and others can obtain technical information about the new tube by sending a three cent stamp to* SCIENCE NEWS LETTER, *2101 Constitution Ave., Washington, D. C., and asking for the Iconoscope Bulletin.*

*Science News Letter, June 22, 1940*

ENGINEERING

# Modern Automobile Design Constitutes Safety Hazard

MODERN automobile design may make an aesthetically pleasing car, but many of its features detract from a car's safety, Dean A. Fales, associate professor of automotive engineering at Massachusetts Institute of Technology, told the meeting of the Society of Automotive Engineers in White Sulphur Springs, W. Va.

Steeply sloped windshields and rear windows are objectionable, he found, because they gather more dirt, and in some cases even cause double vision, where interior reflections produce two images of a traffic light, for instance. They may, on sunny days, cause blinding reflections of the sun for drivers of other cars.

Rear vision is so limited in many recent cars that backing becomes difficult, he stated. The large blind spots in the rear quarter prevent drivers from seeing overtaking cars, and side-swipe accidents result.

While the use of sealed beam headlights gives better illumination of the road at night, placing the driver closer to the road subjects him to increased glare.

"The lower cars give the driver a false sense of security and no passenger car can be built low enough that some drivers cannot leave the road and turn over," he said. "Seating positions in the older cars and busses and trucks give the driver better vision and enable better maneuvering in congested traffic, as well as placing drivers out of the headlight glare zone."

*Science News Letter, June 22, 1940*

BOTANY

## Lack of Calcium in Soil May Cause Nutrient Loss

A PLANT may be growing, yet at the same time instead of taking from the soil nutrients which are needed to build up proteins, it may actually be giving up some of these nutrients to the soil. Dr. William A. Albrecht, head of the department of soils of the University of Missouri's College of Agriculture, speaking before the Midwest Regional Meeting of the American Chemical Society, held at Purdue University, explained how advances in colloid chemistry are helping scientists to understand the way in which plants secure these nutrients.

"Only the finer clay fraction, a small part of ordinary soils, is really active in providing plants with nutrients," he said. "Seemingly clay can be so poor in its stock of such plant nutrients as nitrogen, potassium and phosphorus that a plant like the soybean may be running its woody tissue-making factory while the protein-making items like nitrogen and phosphorus are going in the reverse, from the plant to the soil."

Calcium, he explained, does not move in the reverse direction, though when the clay gives it up, along with potassium and magnesium, for instance, it takes hydrogen in their places. Not a plant nutrient itself, hydrogen makes the soil acid. "In reality, then," he continued, "more soil acidity means less nutrients in the clay and less fertility for crop production." By adding lime, a calcium compound, to the soil, the effect of the hydrogen is counteracted, and there is less chance for the nutrients originally provided by the seed to be lost by going into the ground.

*Science News Letter, June 22, 1940*

RESOURCES

## Mercury Only Strategic Material Bought from Italy

BUYING from Italy only one strategic material in quantity—mercury—the United States is not endangered by loss of vital materials, as an immediate result of Italy's entry into war.

Italy herself, dependent on the United States and other countries for quantities of cotton, petroleum, copper, and scrap iron, is far more adversely affected by the trade consequences of lining up with Germany.

The United States can get along, if necessary, without Italy's mercury exports, mineralogists in Washington declare. Mercury, important in priming explosives and fixed ammunition, in drugs and chemicals, thermometers, antifouling paint for ships' bottoms, and other uses, is being produced this year in sufficient quantity in the United States to meet present needs. United States ore being far less rich in mercury than ores of Spain and Italy, production in this country is expensive. But since start of the war, the price of mercury has shot up from $75 a flask to a record-breaking $200, and at such a level mercury production here is stimulated.

Furthermore, there are substitutes for most uses of mercury, although some of the substitutes are not very satisfactory and using them requires changes in industrial processes.

Since a cartel arrangement between Italy and Spain has control over proportions of exports, possibility that Spain's shipments of mercury to Allied and neutral countries may be affected must be taken into account. A sudden loss of mercury imports would work hardship on France and England, particularly.

In 1939, the United States imported from Spain 2,601 flasks of mercury, 336 from Italy, 562 from Mexico. A flask is equal to 76 pounds.

*Science News Letter, June 22, 1940*

PHYSIOLOGY

## Human Body Uses Iron Over and Over Again

THE human body, like industry, uses iron over and over, say scientists of the U. S. Department of Agriculture, who are studying the body's need of this essential element. Iron is used in the red blood cells. As these cells break down, about 85% of the iron is recovered and returned to the bone marrow. In the whole body there is only enough iron to make an oversized shingle nail.

*Science News Letter, June 22, 1940*

INVENTION

## Fair's Hall of Inventions Desires More Exhibits

HISTORICAL exhibits on American invention and research can still be submitted to the Hall of Inventions of the New York World's Fair for possible display there. Institutions and individuals willing to loan such material for the duration of the Fair are invited by the World's Fair management to communicate with Frank S. Lyon, director of the Hall of Inventions. The Hall, which recently opened, already includes many important inventions.

*Science News Letter, June 22, 1940*

# IN SCIENC

PSYCHOLOGY

## Boys and Girls Outgrow Delinquency of Childhood

JUVENILE delinquency is like a fever that must run its course. Boys and girls that run afoul of the law are not readily cured by present methods of treatment. They usually have to go through their troubles until mature.

This is indicated by a follow-up of Drs. Sheldon and Eleanor Glueck's famous 1,000 juvenile delinquents studied years ago and reported upon in 1934. These former delinquents are now grown up.

Delinquency or crime is abandoned when the individual reaches a certain maturity or social grown-upness, the Gluecks of Harvard indicate in a new book, "Juvenile Delinquents Grown Up" (Commonwealth Fund). But because individuals differ so in personality make-up and early surroundings, this maturity is not always reached at the expected "years of discretion."

Comparison of the careers of these juvenile delinquents with another group of 500 ex-inmates of a reformatory showed strikingly the course of this anti-social fever.

Although the criminal group averaged five years older than the delinquents when they first began to show delinquent behavior, and although they were subjected to many kinds of correctional treatment, yet the course of the two groups was very similar.

By the time the juvenile delinquents had reached an average age of 29, almost 40 per cent. had ceased to be criminals. And of those who continued to commit crimes, the proportion of serious offenders had dropped from 75.6 per cent. to 47.8 per cent.

The "reform" is credited to physical and mental changes that come with the passing of years. Those who failed seemed never able to mature, until they were physically and mentally "burned out" and began instead to disintegrate.

Another influence toward "reform" is the tendency in later life to lose energy and becomes less venturesome. Criminals, too, reach an age of retirement.

*Science News Letter, June 22, 1940*

# CE FIELDS

RADIO

## Skew Radio Studios Newest Acoustics Advance

ONE of the newest acoustical tricks in improving radio is the use of "skew" studios in which all the walls and ceiling are non-parallel, Dr. L. Grant Hector of the University of Buffalo, reports. The slanting walls and ceiling are to prevent the formation of standing acoustical waves in the studio which may create an annoying fluttering noise in the background of the music or speech being picked up with the studio microphone.

*Science News Letter, June 22, 1940*

CHEMISTRY

## Disease-Fighting Antibodies May Be Made by Chemistry

SCIENCE is scheming to put the horse out of another job. One of the essential services that our equine friends render to humanity is the manufacturing of serums for fighting of diseases, such as the pneumonias.

It may be possible to manufacture antibodies, disease germ fighters, in the laboratory by purely chemical means. Dr. Linus Pauling, California Institute of Technology chemist, holds out this hope in his latest studies of molecular structure and behavior.

The process by which an animal manufactures antitoxins has been, in the past, a complete mystery. The new theory provides a reasonable picture of this process, and makes it probable that the whole question will be settled by some further work.

The theory of how antibodies are formed and how they are constructed, as developed by Dr. Pauling, is based upon information about simpler molecules.

He pictures the process of antibody manufacture like this:

The raw material used would be serum globulin, a substance in animal blood, extracted by centrifuging and fractional crystallization without much difficulty. The blood used could be from slaughtered animals. The globulin is a complex protein molecule, a polypeptide, composed of 1,400 amino acid units. In the blood the globulin particles have their units curled up. They would be treated with a substance to unroll them, a process called denaturing. Urea, or some similar reagent, would be used for this purpose.

Then this denaturing agent would be removed in the presence of an antigen, the foreign substance that it is desired to protect against. This would cause the long chain structure of the globulin to fold up again into a new structural form that can be thought of as a short rod on the two ends of which are claspers, ready to seize the foreign substance or toxin. The globulin will then be an antibody.

The way that antibodies catch their prey, to the benefit of the ill person, is by grabbing the germs in their "claspers," forming a clump of material that becomes so much debris without activity or danger.

The correctness of this idea of how antibodies are formed will be tested by experiments, including the attempted manufacture of them by the methods suggested by Dr. Pauling on theoretical grounds.

*Science News Letter, June 22, 1940*

MEDICINE

## New Anesthesia Method Uses Pituitary Extract

OPERATIONS will be easier, for both patient and surgeon, as a result of a new way of giving anesthetics discovered by Dr. Ruth M. Latham, of Detroit. Two hours before the operation Dr. Latham injects a small amount of pitressin, extract from the posterior part of the pituitary gland. A second dose is injected just fifteen minutes before the operation. Result: much less anesthetic is needed to relax the abdominal organs, the surgeon can manipulate them more easily, and the patient awakes from the anesthetic within two or three minutes and almost never suffers from nausea, vomiting and other unpleasant after-effects from the anesthetic.

When the pituitary extract is given, ether was needed to complete the operation in only 18% of the cases, as compared with 66% in non-pituitary treated cases. Gas, such as the dentist uses in his office, and oxygen, sufficed to put the patient to sleep and enable the surgeon to operate in the other cases. Dr. Latham reported her results on over a hundred patients operated on for removal of gall-bladder, appendix and other types of abdominal operations to the American Medical Association in New York.

*Science News Letter, June 22, 1940*

MEDICINE

## Low Resistance to Disease May Come from Faulty Diet

VITAMINS or some other food element may prove the means of protecting children against infantile paralysis, a discovery announced by Dr. Albert B. Sabin and Dr. Carl E. Duffy, of the University of Cincinnati, suggests. (*Science*, June 7)

Poor diet, they discovered, decreases the resistance of young rats to a disease similar to infantile paralysis in that it is caused by a virus which attacks the nervous system. The decreased resistance occurs whether the young rats are eating the poor diet during their growing period or whether their mothers were on the poor diet during the nursing period.

Lack of vitamin $B_1$, of riboflavin, or of vitamin E may be the dietary fault that decreases resistance to virus invasion, or there may be some other dietary fault responsible.

Animals as they grow older develop resistance to involvement of the nervous system by certain viruses, Dr. Sabin discovered in previous studies. This increased resistance with age is not due to immunity acquired through exposure to infection nor because of a maturing of the whole animal or of its entire nervous system. It is the result of changes in certain tissues or structures which the viruses must pass before they can give rise to paralysis or encephalitis ("sleeping sickness").

These tissue changes, the latest studies show, are influenced by the diet of either the growing animal or its mother during the nursing period.

While inadequate nutrition could prevent or retard appearance of resistance to virus invasion of nervous tissue in young animals, it has not been possible to break down this resistance by poor diet in full-grown animals once they have acquired the resistance to the virus.

*Science News Letter, June 22, 1940*

ORNITHOLOGY

## Slow Motion Pictures Aid in Portraying Flight

**See Front Cover**

THE LIFELIKE quality of the picture of mallards on the front cover of this week's SCIENCE NEWS LETTER was obtained by the etcher Richard E. Bishop partly through study of slow motion pictures of the birds in actual flight. He splices a few feet of film in a loop and runs it continuously for study.

*Science News Letter, June 22, 1940*

NUTRITION

# Streamlined Rations

## For Emergency Use, Army Research Has Prepared New Concentrated Foods for Quick, Intensive Energy

By EMILY C. DAVIS

A HIGHLY specialized candy bar that is a whole emergency meal in itself. This is the U. S. Army's new answer to the problem of packing a tiny lunch for soldiers who may find themselves unexpectedly "on their own" when mess time comes.

While the army's research was intended for soldiers entirely, it may do a good turn for civilian explorers, mountain climbers, and hikers, not to mention motorists who can't discover that hoped-for tea room, and stenographers who grow weak an hour before quitting time.

Developed in the Quartermaster Corps' subsistence laboratory at Chicago, the new emergency ration looks like any small chocolate bar. Actually, besides chocolate it contains vanilla, sugar, milk, and oat flour. It tastes all right. Meaning to say, the American soldier will find it an improvement over the not-too-tempting chocolate emergency ration the Quartermaster Corps handed out to our soldiers when they were fighting in France in 1918. And besides being easy to take, the new ration is an improvement nutritionally. Concentrated foods can be made more palatable now, as a result of research in recent years.

### Calories a Strong Point

Calories are the strong point of the chocolate-soldier ration of 1940. Calories are what an emergency ration is expected to supply, in greatest possible quantity. Calories, which the lady-on-a-diet considers a word to shudder at, are vital to a stranded, hungry man, perhaps on outpost duty and cut off by mischance from his division.

The little packet represents 600 calories, or units of energy-producing food—sugar, starch, protein, fat. That is about the amount of calories in a lunch or light dinner. But understand, the little emergency ration is not, emphatically, a balanced meal. It is no proper substitute for a regular lunch or dinner. It has one job to do—supplying staying power and energy to enable a man in time of emergency to keep going.

"In rationing for emergency," says Major Paul P. Logan of the Army Industrial College, "the problem is to pack concentrated energy food into smallest possible space and into a package that will resist wear-and-tear, including heat up to 120 degrees, and even war gas."

Major Logan conducted research for the new chocolate ration.

"The most highly concentrated food we know of would be fat," he explains. "Pure fat, with no water in it, would provide 4,100 calories to a pound. But the fat would not be edible. The chocolate ration, representing 2,400 calories to a pound, is the nearest approach to straight fat that we could make edible."

### Bureau of Standards Aids

To aid the Army in the research task of making a weather-proof, gas-proof wrapper for the ration, the National Bureau of Standards tested various materials. The result is a three-layer wrapping. First around the chocolate bar goes aluminum foil heavier than that on ordinary candy. This forms a hermetic seal. Then comes a wrapper of white vegetable parchment, which becomes tougher in damp weather. An additional overcoat of green paper is simply what is technically called a bumper, and it takes the label "U. S. Army Emergency Ration," with a warning not to eat the ration fast—take half an hour.

To make sure the ration would not go soupy in the tropics, the Quartermaster Corps has already given it experimentally to American soldiers in Panama, Hawaii, and the Philippines to carry in their pockets, haversacks, and saddle bags.

As a stiff war conditions test, some of the ration packets were turned over to the Chemical Warfare School at Aberdeen, Maryland. There, for three hours, the ration packets were bombarded with fumes of mustard gas. Then, peeling off the protective wrappings, Army chemists fed shavings of the "gassed" emergency ration to laboratory rats. The rats showed no ill effects, so the Army feels confident that it has a gas-proof wrapping.

The Quartermaster Corps does not call its new chocolate ration an emergency ration, says Capt. John Powers of the subsistence division of the Quartermaster Corps. Ration D is the correct, official name. The pocket ration fits into the Army's new set of alphabet names for field or wartime rations: A, B, C, and D.

Capt. Powers says American soldiers enjoy singing.

"They feed us carrots every day,
"Wonder when they'll feed us hay?"

And they like to echo the bugler at mess call, chanting:

"Soupy, soupy, soupy without a single bean,
"Porky, porky, porky without a streak of lean,
"Coffee, coffee, coffee, the thinnest ever seen."

But actually, the American soldier is the best fed in the world. To make field and wartime rations as near as possible to the peacetime garrison ration, the Quartermaster Corps devises ingenious plans for transporting, packing, space saving. It mounts field kitchens—a new model was recently christened—on trucks and transports them to camp grounds, to insure hot food whenever possible. It has even landed eggs and other perishables by parachute from planes. Quartermaster officers can tell you that by trimming and boning a ton of beef, they can reduce 134 cubic feet of beef in shipping to a mere 32 cubic feet.

### Vegetables and Fruit

So, Ration A, which is the preferred field ration, is complete with fresh vegetables, butter, fruit, meat, and other bulky but desirable foods, Capt. Powers states. Ration B is similar, with substitution of some canned goods, jelly instead of butter, and hard bread for fresh. The Army goes on Ration B when it moves in streamlined transport minus everything but necessary equipment.

A brand-new Ration C—the reserve ration — also streamlined, has been evolved. Taking its first large-scale test in April and May, the new Ration C has been fed to 65,000 soldiers during the spring maneuvers in Mississippi and Texas.

Reserve rations are nothing for a soldier to cheer over. But the new one, so new that labels have not been made yet for cans, is rated a big improvement over the one that has been used. Ration C is a two-can meal, to be eaten either hot or cold. One can contains a meat and vegetable combination, and there are three variations on this. The other can contains sugar, soluble coffee and nine bis-

cuits. Rationed out to the men at the rate of six cans a day, this reserve chow provides four pounds of food for a day. This is less than the American soldier is accustomed to regularly, but then the reserve ration is intended only for use when normal transport is interrupted, and the Quartermaster Corps does not recommend its use even then for more than three days.

That brings us back to Ration D, which is the newest equivalent of the old British Iron Ration, and all the other last-ditch rations in history.

The Iron Ration was so distinctly a last-resort meal that British soldiers used to say the orders were:

"Never eat your Iron Ration until after you've starved to death!"

Even the present tinned emergency ration supplied to British fighters carries the warning, "To be consumed only when no other ration of any other kind is procurable."

The American soldier's chocolate bar carries no stern warning—only instructions to eat it slowly. Nor has any effort been made to make the new ration unpalatable, Major Logan states. After all, a man who sits down to a chocolate bar supper, when somewhere back in camp other men are getting a round meal, needn't be additionally harassed by finding the ration is deliberately made just barely edible.

Uses of the new emergency ration by civilians are not the Army's problem. But Quartermaster Corps officers can see that the energy ration might fit into other situations, provided the public recognizes its limitations.

The Army's Ration D may become familiar to a public that will never get even a taste of Rations A, B, and C.

*Science News Letter, June 22, 1940*

ICHTHYOLOGY

## Higher Fish Species Born Alive in Membrane

THE EMBRYOS of higher fish species that are born alive instead of being hatched from eggs laid in the water are surrounded before birth with sheathing membranes somewhat resembling those of the warm-blooded animals that are uniformly born alive, Dr. C. L. Turner of Northwestern University has found. Although there are considerable differences in detail and in mode of functioning, even the technical names are the same: amnion, chorion, allantois.

*Science News Letter, June 22, 1940*

*CANNED CHOW FOR THE ARMY*

***The U. S. Army's new reserve ration, alphabetically called C, is shown served up. For real emergency use, the doughboy is supplied with Ration D, a specialized chocolate bar, shown lower right, partly opened.***

NUTRITION

# Vitamin Famine Prevalent In the United States

## Chronic Deficiency is Due to Unbalanced Diet And Also to Loss of Vitamins in Processing of Food

WAR may be causing famine in Europe but here in America, even without war, there is a chronic famine, Dr. Tom D. Spies, of Birmingham, Ala., declared at the meeting of the American Medical Association. The chronic famine we have here is a starving for vitamins, minerals and other precious substances found in minute amounts in foods. Large numbers of people are starved for these substances partly because they do not eat enough of the foods containing them and partly because foods as they come to the table today have lost much of their normal content of these protective substances.

About 90 per cent. of the vitamin $B_1$, preventive of beriberi, in bread has been lost from the flour in the milling process. Water soluble vitamins are also lost to us by being washed out of the soil, so the plants today do not furnish enough of these to the animals and men that live on them, Dr. Spies said.

Death figures do not show the extent of this chronic famine in America, Dr. W. H. Sebrell of the U. S. Public Health Service declared. This, partly, is because deaths from this cause are not all recorded as pellagra or scurvy or beriberi deaths. Partly, too, it is because this famine does not kill, although it keeps people ailing and miserable and unfit for work. At least 100,000 people are probably suffering from pellagra, Dr. Sebrell estimates.

For a more complete picture of the extent of the vitamin deficiency in the country, Dr. Sebrell turned to figures on consumption of vitamin pills and similar preparations. In 1938 the people of the United States spent more than $100,000,-

000 for vitamin preparations manufactured or sold through pharmaceutical channels, it is estimated. Maybe not all of this vast amount of vitamin-taking by the people was necessary to stave off vitamin famine or repair its ravages. The sum of $26,000,000, however, was spent in 1937 on vitamins prescribed by physicians, Dr. Sebrell said.

"A figure of this magnitude," he explained, "must mean that physicians are becoming increasingly aware of the value of the preparations in treatment and, conversely, that vitamin deficiency symptoms are widely prevalent."

The figures on vitamin consumption today are probably much higher, he said, because in 1937, latest year on which figures are available, neither nicotinic acid nor riboflavin were widely used.

"Prevention and proper treatment of the nutritional diseases," he declared, "constitute one of the greatest medical problems in this country today."

*Science News Letter, June 22, 1940*

MEDICINE

# Pill Protects Children Against Scarlet Fever

## Drug Which Aids in Battle Against Brain Syphilis And Preventive of Diabetes in Dogs Also Reported

A PILL or tablet that can be swallowed to give protection against scarlet fever was announced by Dr. George F. Dick and Dr. Gladys Henry Dick, Chicago, at the meeting of the American Medical Association in New York City.

The tablet contains purified scarlet fever toxin such as is now used to give immunity by injections under the skin. The tablet was designed for use in patients who cannot be given the injections. Such patients include those suffering from hemophilia, for which a hypodermic needle injection may mean dangerous bleeding; patients with severe heart injury; and persons in institutions under quarantine for scarlet fever when speed in immunization is a prime consideration.

*Science News Letter, June 22, 1940*

### Drug Aids Against Paresis

SUCCESS of a new drug, thio-bismol, in helping the fight against brain syphilis, or paresis, was reported by Dr. Harold N. Cole, of Cleveland.

The new drug controls the fever of malaria which is now being widely used in treatment of this form of syphilis, Dr. Cole explained. By means of this bismuth compound, the chills and fever can be kept from becoming too severe without stopping the malaria treatment altogether. For terminating the malaria quinine must still be used.

Collaborating with Dr. Cole in trial of the new drug were Dr. Gerard A. DeOreo, Dr. James A. Driver, Dr. Herbert H. Johnson, of Cleveland, and Dr. Walter F. Schwartz, now of Pasadena, Calif.

*Science News Letter, June 22, 1940*

### Prevent Diabetes in Dogs

THE FIRST steps toward prevention of diabetes have been made by medical scientists, among them Dr. C. H. Best of Toronto, declared Dr. H. F. Root of Boston, at the meeting of the American Medical Association.

The disease has actually been prevented in dogs, though not yet in humans, he explained. This prevention has been accomplished in two ways. It depends on the discovery that diabetes can be caused either by failure of the insulin-producing part of the pancreas or by overwork of this insulin factory in the pancreas. In dogs this overwork is due to stimulation of the insulin-producing cells by injections of an extract from the pituitary gland in the head.

Insulin given at the same time as the pituitary extract, however, prevents the diabetes. It can also be prevented by fasting the dog before the pituitary extract is given.

If the diabetes is allowed to develop under pituitary stimulation, giving insulin allows the overworked insulin factory in the body to rest and renew or regenerate itself. This regeneration of insulin-producing cells occurs in humans also, Dr. Root said. The star-shaped cells called mitotic figures, which are signs of rapid regeneration of body tissue, have been discovered in the insulin-producing part of human pancreases. The question now, Dr. Root explained, is to learn how to favor this regeneration in humans.

Many people, he pointed out, are on the border of diabetes. If these persons get pneumonia or a bad tonsil infection, perhaps, they will be tipped over the border because the infection caused too much strain on their insulin factories. With the right treatment and diet, however, they can be helped to recover from their diabetes. Their insulin-producing cells may regenerate as do those of the dogs studied.

New synthetic sex hormones are helping women with diabetes to have babies successfully, Dr. Priscilla White of Boston reported. Loss of babies by diabetic mothers has been cut in half since treatment with these hormones was started two years ago, she announced.

The hormones used are called stilbestrol and pranon.

Not every expectant mother with diabetes needs this treatment. Blood tests can now be made, however, to show whether the diabetes is severe enough to upset the glandular balance of the mother's body and so cause her baby to be born so far ahead of time that it cannot live.

*Science News Letter, June 22, 1940*

### Operation Saves Ulcerous

ONLY hope for saving the lives of one-third of the older patients having massive bleeding from stomach ulcers is prompt operation, Dr. John H. Blackford and Dr. Robert H. Williams, Seattle, conclude from a study of the grisly records in the city bureau of vital statistics of patients who died of stomach ulcer.

Among 23,965 deaths they found 116 which could be attributed to hemorrhage from ulcer. More than 97% of the group were over 45 years old and 78% of them died of the first hemorrhage. Late operations performed after other methods of treatment have proved unsuccessful have usually resulted in death, the Seattle doctors emphasized.

The risk of death from ulcer hemorrhage, grave hazard for the older person, is less than 1% for younger persons.

*Science News Letter, June 22, 1940*

### Sulfanilamide for Impetigo

SULFANILAMIDE is an efficient remedy for one type of the distressing skin disease, impetigo, but not for the other, Dr. Stephan Epstein, Marsh-

field, Wis., said in announcing that there are two types of this malady.

One type is caused by streptococcus germs and for this sulfanilamide is an efficient remedy. The other type is caused by another germ, the staphylococcus against which sulfanilamide is less, if at all, effective.

The staphylococcus type predominates in the Middle West, Dr. Epstein finds, while the streptococcus type is more common in the East and in Western Europe.

*Science News Letter, June 22, 1940*

## Immediate Operation Urged

PATIENTS with acute appendicitis should be given the benefit of immediate operation rather than be given the so-called delayed or expectant treatment, Dr. Edward S. Stafford, Baltimore, declared.

Analysis by himself and Dr. David H. Sprong, Jr., of the mortality among 1,317 patients operated on for acute appendicitis at the Johns Hopkins Hospital between Sept. 1, 1931 and Sept. 1, 1939, has convinced these surgeons that the patient has a better chance of surviving when operated immediately.

Surgeons know that death "seldom follows the competent removal of an acutely inflamed, but unperforated appendix," Dr. Stafford pointed out. At present, however, surgeons are not agreed as to the proper treatment of patients having acute appendicitis with complications such as perforation or rupture of the appendix. Those who favor delay argue this gives a better chance for the body mechanism for defense against infection.

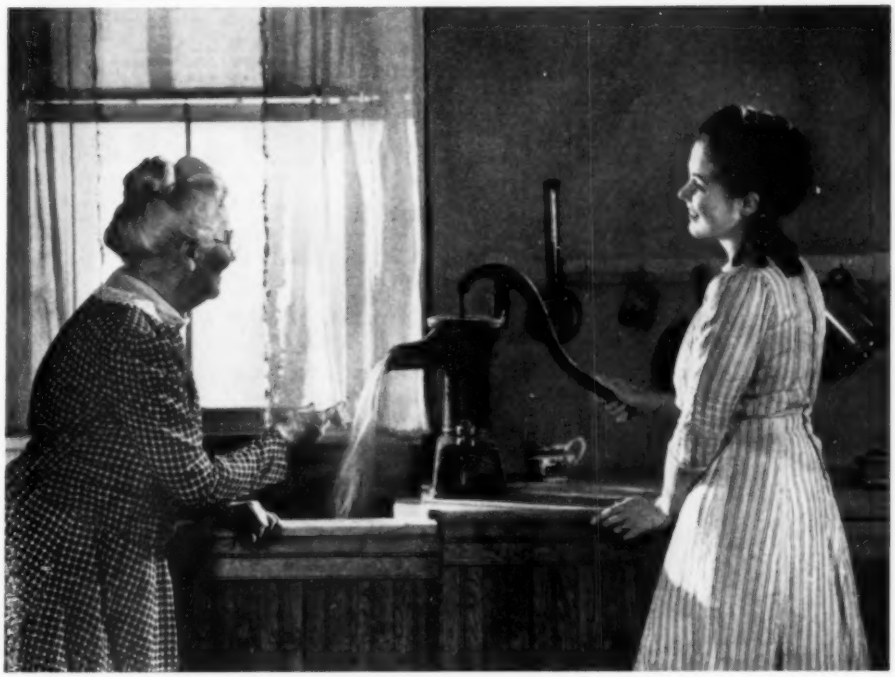
Elimination of the source of the infection, which means removing the appendix, should be the first step in treatment, the Baltimore surgeons believe, although they agree that the principle of physiologic rest is important and that handling and operative injury should be kept to a minimum.

Arguments they presented against the delayed treatment are: 1. The most experienced surgeon cannot always tell accurately whether an appendix has ruptured; 2. Even if the patient recovers from the attack, he still has his appendix and is in danger of another attack.

More careful study and better treatment of complications, Drs. Stafford and Sprong conclude, will achieve better results than adopting the method of delayed treatment.

*Science News Letter, June 22, 1940*

*(Turn to Page 398)*



"My! How Handy!"

**"A pump right in the kitchen! What'll they think of next? You're a lucky woman, Josephine."**

LUCKY? Yes—compared with toting heavy pails of water from an outside well. But if Josephine was lucky, what about her granddaughter of today, with her modern electrified kitchen?

With electric lights, Josephine's granddaughter doesn't have to fill and clean lamps. With her electric refrigerator, she doesn't have to keep the butter in the cellar in summer. Her electric cleaner makes it unnecessary to lug the carpets out and beat them. With her electric range, she doesn't cook over a hot stove. And the furnace keeps the house temperature right without her going near the cellar.

Even if electricity stopped here, we'd still recognize it as one of the greatest benefits of our century. But in every branch of industry, electricity helps to make manufactured articles available at such low prices and in such quantity that more millions of people can enjoy them.

For more than 60 years General Electric scientists, engineers, and workmen have been making electricity more useful—creating for all of us hundreds of comforts unknown to any former generation. Their efforts today are producing More Goods for More People at Less Cost.

*G-E research and engineering have saved the public from ten to one hundred dollars for every dollar they have earned for General Electric*

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MEDICINE

# "Hit and Run Rheumatism," Makes Debut as New Disease

## New Type "Strikes Fiercely and Leaves Shortly"; Hits Finger, Wrist, Shoulder, Knee, Toe, or Elbow

A NEW disease, "hit and run rheumatism," made its debut at the meeting of the American Rheumatism Association in New York City.

The disease, also termed "'phantom rheumatism'—now you see it, now you don't," was described by Dr. Philip S. Hench, of the Mayo Clinic, in his presidential address.

From six to nine new patients with this ailment are now appearing every year at the Mayo Clinic, but Dr. Hench believes there may be many more whose ailment has not yet been recognized.

Both sexes get this disease, although there were a few more women than men among the 34 cases reported by Dr. Hench today. This sort of rheumatism "strikes fiercely and leaves shortly. Although it often strikes fiercely, it does not destroy the joint," Dr. Hench said in describing it.

The attacks usually last one to three days, rarely more than one week. Intervals between attacks vary from one or two days to one to six months. Favorite spots of attack were a finger joint, wrist, shoulder, knee, toe or elbow, though practically any joint is liable to attack.

Some patients had "hundreds" of attacks, "too many to remember." Others had as few as from two to ten per year. Patients have endured the disease as long as 25 years, the average length for the 34 patients being seven years. Dr. Hench has figured that 30 patients have had a total of at least 4,930 attacks.

The pain is generally a severe ache, but occasionally is so severe narcotic drugs are needed to give relief. Disability was considerable among these patients and some were often forced to go to bed during an attack.

No cure for the disease has been discovered, though many kinds of treatment were tried. One patient "adopted a baby, quit worrying about herself, and was cured."

Three other patients got well, perhaps spontaneously, 12 are better, 7 are just the same, the disease going "merrily on," 3 are somewhat worse and one died of heart disease.

*Science News Letter, June 22, 1940*

### Tendency Inherited

SUSCEPTIBILITY to rheumatic fever, estimated to afflict one out of every 100 children in the country, damaging their hearts, is apparently inherited, Dr. May G. Wilson, Dr. Ralph E. Wheeler and Dr. Morton D. Schweitzer, of New York, reported.

The disease has long been known to run in families but they did not find, in their study of the condition in 112 families, that it was passed back and forth from case to case in the family as a contagious disease would be.

In families where one parent had rheumatic fever, the attack rate among the children was double that for families where neither parent had the disease. The attack rate was four times as great in families where both parents were rheumatic.

These figures are inconsistent with the theory that the disease is contagious and give further evidence that hereditary susceptibility is the reason why the disease runs in families.

*Science News Letter, June 22, 1940*

From Page 397

### Where "Nerves" Originate

DON'T tell the woman with "nerves" to "snap out of it" or to "forget it". Her symptoms are real and just as distressing and frightening as they would be if a doctor injected into her veins a big dose of adrenalin or any other powerful drug. Recent discoveries of physiologists, Dr. Walter Alvarez, of the Mayo Clinic, told members of the American Medical Association, show that the symptoms complained of by the woman—or man for that matter—with nerves are due to erratic behavior of a "thermostatic center" in the brain.

This center is called the hypothalamus. Normally, it controls the involuntary nervous system and the glands of internal secretion. In turn, it is controlled by the thinking part of the brain. When this thermostat gets out of order, jitteriness, outbursts of anger, sleeplessness, and abnormal worrisomeness are likely to result. The reason is that "nervous storms" are going out along the involuntary nerves, at the ends of which are forged powerful chemical substances that have disturbing effects on most of the body. When the involuntary nervous system gets upset this way, it plays disconcerting tricks on the heart, blood vessels, digestive tract, kidneys and skin.

The thermostatic center can be upset by fatigue, insomnia and nervous strain, by disease and, in older persons, by little clots in the brain resulting from hardening of the arteries. As to the woman with nerves, Dr. Alvarez declared, "No one can blame her for being distressed and frightened and no well-informed person should even think of telling her to forget it or snap out of it."

*Science News Letter, June 22, 1940*

### Stomach Ulcer Relief

A POWDER extracted from human body fluid which gave encouraging results in treatment of 60 stomach ulcer patients was on display at the meeting of the American Medical Association.

This promising new remedy for stomach ulcers was developed by Dr. David J. Sandweiss, Dr. M. H. F. Friedman, Dr. H. C. Saltzstein and Dr. A A. Farbman,

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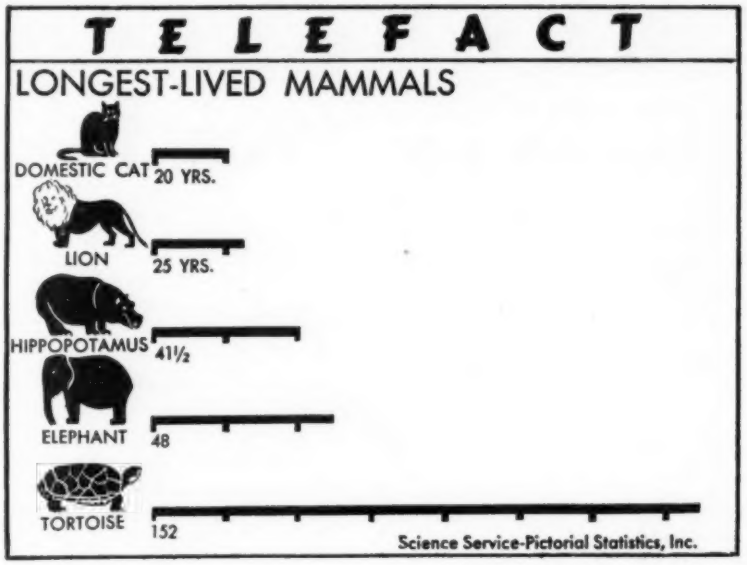
of Wayne University College of Medicine and Harper Hospital, Detroit.

The substance, still unidentified, not only cured experimental ulcers in dogs but actually prevented their development. The patients who have been treated with this new substance have not been followed long enough, nor have there been enough of them for the Detroit doctors to be sure they have a stomach ulcer cure, but they are encouraged to hope so.

The anti-stomach ulcer substance was found in the kidney excretions of normal healthy women but only negligible amounts were found in the excretions of ulcer patients. Whether the peptic ulcer patient has his ulcer because of deficiency of the substance is not now known.

The powder is given in the form of a liquid injected under the skin. When given in large doses, it checks the secretion of acid in the stomach. Only small doses, however, are needed for ulcer.

*Science News Letter, June 22, 1940*




*Science News Letter, June 22, 1940*

POPULATION

# More Casualties in 4 Weeks Than in 4 Months of Verdun

THE GERMAN conquest of Belgium and the northeast corner of France, and Allied resistance took more soldiers' lives and wounded more men in four weeks than the four months of bloody Verdun in 1916, the most conservative possible guess at total casualties indicates.

It is probable that at least 600,000 of the two to two and a half million men engaged were killed or wounded. Verdun cost 596,000 casualties, according to Capt. B. H. Liddell Hart, British World War I historian.

As at Verdun—where 315,000 Frenchmen and 281,000 Germans were put out of action, aside from prisoners taken by each side—the defending Allies probably suffered the greater losses. Perhaps 325,000 to 350,000 of the total killed or wounded were British, French or Belgian. The Allies and the Germans each claim killing and wounding half a million of the enemy—a million in all, which figures must be discounted. None of these figures include casualties among the millions of refugees who got in the different armies' way and whose killing and wounding by the scores of thousands was inevitable whether deliberate or not.

Wounded are supposed to outnumber the killed by as much as four to one, but statistics of the last great war certainly do not bear this axiom out. The four years and three months of hostilities on three fronts — western, Italo-Austrian, and eastern — killed 8,538,315 and wounded 21,210,452, according to the U. S. War Department. This is a ratio of five to two. The ratio holds very nearly for each of the powers that lost most heavily during the conflict: Germany, 1,773,700 killed and 4,216,058 wounded; France, 1,357,800 and 4,266,000; British Empire, 908,371 and 2,090,212; and Italy, 650,000 and 947,000. The United States suffered 126,000 killed and 234,000 wounded. These figures include among the killed those who died of disease—in most cases as much war victims as those who died of shot or shell—but does not include a much larger number of missing, practically all of whom must be considered dead. They were the ones of whom not enough was left to identify.

On the basis of these figures, deaths as high as 200,000 and wounded totaling 400,000 are not unreasonable.

One First World War offensive was even more costly than Verdun or the gigantic battle for Flanders, but it took longer—the four-and-a-half-month Allied offensive on the Somme. Capt. Hart estimates the cost of the bloodbath in which the Allies captured all of 120 square miles (a little more than one-third the area of New York City) at a cost of 700,000 Germans, 400,000 British and 250,000 French casualties. Other educated guesses are still higher. It will be noted that the troops on the offensive, the Allies, lost fewer men. The Somme in 1916 as well as Verdun and Flanders seem colossal exceptions to the theory that offense takes more lives than defense.

The two to two and a half million men in the Flanders battle is also a conservative estimate.

*Science News Letter, June 22, 1940*

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# •First Glances at New Books

CHEMISTRY—PHOTOGRAPHY

NATURAL COLOR PROCESSES (3d. ed.)—Carlton E. Dunn—*American Photographic Pub. Co.*, 232 p., $2. With the rapidly increasing interest in color photography, many advanced amateurs will want more details concerning more special processes, particularly those for making color prints. In this, the third edition of his book, Mr. Dunn gives the practical information that such a photographer will need.

*Science News Letter, June 22, 1940*

CHEMISTRY

PHYSICAL CONSTANTS OF HYDROCARBONS, Vol. II, Cyclanes, Cyclenes, Cyclynes, and Other Alicyclic Hydrocarbons—Gustav Egloff—*Reinhold*, 605 p., $12. Since one-fourth of the world's 1939 oil production of two billion barrels consisted of cyclane hydrocarbons, the importance of the data contained in this new volume in the American Chemical Society's Monograph Series can well be realized.

*Science News Letter, June 22, 1940*

TECHNOLOGY—CHEMISTRY

CONVERSION OF PETROLEUM, Production of Motor Fuels by Thermal and Catalytic Processes—A. N. Sachanen—*Reinhold*, 413 p., $6. Though thermal cracking remains the most important means of converting petroleum products into gasoline and other fuels, newer catalytic methods are gradually assuming an important place. These are fully discussed in this new monograph.

*Science News Letter, June 22, 1940*

CHEMISTRY

THE KINETICS OF CHEMICAL CHANGE—C. N. Hinshelwood—*Oxford*, 274 p., $4.50. This is the fourth edition of a book which first appeared in 1926, originally called "The Kinetics of Chemical Change in Gaseous Systems." The shorter title has been adopted, it is explained, because "the distinction between gas reactions and reactions in other states of matter has tended to become of less practical importance than it was."

*Science News Letter, June 22, 1940*

ORNITHOLOGY

WILD BIRD NEIGHBORS — Alvin M. Peterson—*Bruce (Milwaukee)*, 283 p., $2. A great deal of information about the commoner species of birds (mostly songbirds) is packed into this book. The style is easy and informal, with nothing of the didactic about it, which adds to readability and makes absorption easy.

*Science News Letter, June 22, 1940*

BOTANY

FLORIDA TREES—Ethel Snyder—*Geddes Printing House, Fort Myers, Fla.*, 150 p., $1. A compact, low-priced book about the cultivated and native trees of Florida, styled to the needs of the average visitor or winter sojourner. Treatment is conveniently divided into four sections: Palms, Ornamental and Forest, Tropical and Sub-Tropical Fruits, and Miscellaneous.

*Science News Letter, June 22, 1940*

CHILD STUDY

JUVENILE DELINQUENTS GROWN UP—Sheldon and Eleanor Glueck—*Commonwealth Fund*, 330 p., $2.50. See page 392.

*Science News Letter, June 22, 1940*

CHEMISTRY

SO THAT'S CHEMISTRY!—R. Ray Baker—*Reilly & Lee*, 128 p., $1. A boys' book of chemistry presented in dialogue form in conversations between young Bobby and the Old Professor.

*Science News Letter, June 22, 1940*

ENGINEERING

PROCEDURE HANDBOOK OF ARC WELDING DESIGN AND PRACTICE (6th. ed.), *Lincoln Electric Co.*, 1117 p., $1.50 in U.S.A., $2 elsewhere. Practical arc welding for the technician.

*Science News Letter, June 22, 1940*

EDUCATION

THE AUDIO-VISUAL HANDBOOK—Ellsworth C. Dent—*Society for Visual Education*, 209 p., $1.50. A wealth of information for school men and women about films, projectors, phonographs, maps and charts and other means for reaching the mind through eye and ear.

*Science News Letter, June 22, 1940*

MINERALOGY

MINERAL MAP OF EUROPE—*The Pure Oil Co.*—Map, Supplementary data, 61 p., $3.50. In these days, when the tug of war is settling world power largely on the basis of available mineral resources of the nations, a work of this kind is both illuminating as information and useful as a mass of working facts. The large map shows graphically the distribution of metals, fuels, etc., while the pages of tables in the text sum up in compact, easily digested form the most important figures on production and reserves.

*Science News Letter, June 22, 1940*

TECHNOLOGY

IRON AND STEEL TO-DAY—John Dearden—*Oxford Univ. Press*, 190 p. illus., $1.75. This is a popularly written and well illustrated account of the British iron and steel industry, upon which, in large part, now seems to depend the future of England.

*Science News Letter, June 22, 1940*

METEOROLOGY

THE METEOROLOGICAL GLOSSARY (3rd. ed.)—Great Britain, Air Ministry, Meteorological Office—*Chemical Pub. Co.*, 251 p., $3. This book is more than a glossary; it is a compact one-volume encyclopedia, with clear definitions and brief discussions of all common (and many uncommon) meteorological words and concepts. With meteorology coming into its own as a university subject, it should find wide use.

*Science News Letter, June 22, 1940*

GENERAL SCIENCE

THE ADVANCEMENT OF SCIENCE, No. 3, April 1940—*British Assoc. for the Advancement of Science*, 124 p., 5 s. A continuation of reports of the 1939 meeting.

*Science News Letter, June 22, 1940*

TECHNOLOGY

INSTITUTE OF SCRAP IRON & STEEL YEARBOOK—*Institute of Scrap Iron & Steel*, 86 p., $1. The first compilation of statistics on the iron and steel scrap industry. It is planned to make the volume an annual series. The importance of steel scrap in the present economy of a military world makes this book a valuable source reference on a vital factor in modern civilization.

*Science News Letter, June 22, 1940*

CHEMISTRY—BIBLIOGRAPHY

CHEMICAL PUBLICATIONS, Their Nature and Use (2d. ed.)—M. G. Mellon—*McGraw-Hill*, 284 p., $2.75. "The material included constitutes the basis of an undergraduate course in chemical literature, the general aim of which is to present to the student some conception of the types of chemical information which are available, where they may be found, and how to locate them."

*Science News Letter, June 22, 1940*

BIBLIOGRAPHY—AGRICULTURE

LIBRARY CATALOGUE OF PRINTED BOOKS AND PAMPHLETS ON AGRICULTURE PUBLISHED BETWEEN 1471 AND 1840 (2d. ed.)—*Rothamsted Experimental [illegible]on, Harpenden, Herts, Eng.*, 293 p., 12s.

*Science News Letter, June 22, 1940*